CLAIMS

Amend the claims as follows.

1. (Currently Amended) A signal processing apparatus comprising:

a plurality of receiving elements configured ~~means arranged~~ to receive a composite signal indicative of a plurality of symbols transmitted, substantially simultaneously, from a plurality of remote transmission elements; ~~means,~~ and

a processing deviee configured ~~means arranged~~ to iteratively decode each of the plurality of symbols ~~most probable symbol~~ contained in the ~~said~~ composite signal, wherein the composite signal is represented, at least in part, by a channel gain matrix, wherein the processing device is further configured to perform a decomposition of the channel gain matrix into an orthogonal matrix Q and a triangular matrix R, and wherein the plurality of symbols are decoded within a constrained enumeration formalism of the triangular matrix R.

2. (Currently Amended) The apparatus ~~Apparatus~~ according to ~~Claim~~ claim 1, wherein the processing device ~~means~~ is arranged to define an enumeration constraint for use in the constrained enumeration formalism, and wherein the enumeration constraint comprises a number of entries in the triangular R matrix over which the plurality of symbols are enumerated.

3. (Cancelled)

4. (Cancelled)

5. (Currently Amended) The apparatus ~~Apparatus~~ according to ~~Claim~~ claim 1, wherein the processing device ~~means~~ is further configured ~~arranged~~ to determine a ~~the~~ most probable symbol by enumerating across all symbol conditional probabilities for each possible symbol.

6. (Currently Amended) The apparatus ~~Apparatus~~ aecording to ~~Claim~~ claim 5, wherein the processing device ~~means~~ is further configured ~~arranged~~ to convert a symbol

conditional probability to a bit level logarithmic likelihood ratio (LLR).

7. (Currently Amended) The apparatus ~~Apparatus~~ according to ~~Claim 1~~ claim 6 including a parallel to serial conversion device configured ~~means arranged~~ to convert parallel, bit level[[,]] LLR's into a single stream of LLR's.

8. (Currently Amended) The apparatus ~~Apparatus~~ according to ~~Claim~~ claim 7 including a deinterleaving device configured ~~means arranged~~ to deinterleave the parallel, bit level[[,]] LLR's from the single stream of LLR's.

9. (Currently Amended) The apparatus ~~Apparatus~~ according to ~~Claim 1~~ claim 6 including a decoding device configured ~~means arranged~~ to apply iterative soft input soft output (SISO) decoding to single bit LLR's to determine the plurality of symbols ~~a symbol~~.

10. (Currently Amended) The apparatus ~~Apparatus~~ according to ~~Claim~~ claim 9, wherein the decoding device ~~means~~ is further configured ~~arranged~~ to pass a symbol probability to the processing device to iteratively decode each of the plurality of symbols ~~processor for inclusion in an iterative enumeration step~~.

11. (Currently Amended) The apparatus ~~Apparatus~~ according to ~~Claim~~ claim 9 including a hard decision unit configured ~~that is arranged~~ to determine the plurality of symbols ~~a symbol~~ based upon a soft output from the decoding device ~~means~~.

12. (Currently Amended) A method of signal processing for a multiple input multiple output (MIMO) ~~MIMO~~ system comprising ~~the steps of~~:

~~i)~~ receiving a composite signal indicative of a plurality of symbols;

~~ii)~~ performing a QR decomposition upon a channel gain matrix for the composite signal;

~~iii)~~ defining an enumeration constraint;

~~iv)~~ calculating possible conditional probabilities for one of the plurality of symbols contained within the composite signal, using the enumeration constraint; and

~~v)~~ iterating said calculating ~~step iv),~~ incorporating a most probable symbol for the one symbol determined in a ~~the~~ previous iteration of ~~step iv) in~~ the conditional probability calculation ~~operation~~.

13. (Currently Amended) The [[A]] method according to ~~Claim~~ claim 12 including setting the enumeration constraint to encompass a sub-set of possible transmit antennas.

14. (Currently Amended) The [[A]] method according to ~~Claim~~ claim 12 including defining the enumeration constraint as a number of elements within an R matrix over which the one symbol is enumerated, wherein the QR decomposition comprises the R matrix and an orthogonal Q matrix.

15. (Currently Amended) The [[A]] method according to ~~Claim~~ claim 12, wherein the possible conditional probabilities are calculated ~~including calculating a symbol conditional probability in order~~ to determine a ~~the~~ most probable symbol received over a given transmission channel.

16. (Currently Amended) The [[A]] method according to ~~Claim~~ claim 15 including converting the possible ~~symbol~~ conditional probabilities ~~probability~~ to bit level logarithm likelihood ratios (LLR's) ~~ration (LLR)~~.

17. (Currently Amended) The [[A]] method according to ~~Claim 12~~ claim 16 including converting a plurality of parallel streams of bit level LLR's to a serial stream of bit level LLR's.

18. (Currently Amended) The [[A]] method according to ~~Claim~~ claim 17 including deinterleaving the bit level LLR's from the serial stream of bit level LLR's.

19. (Cancelled)

20. (Currently Amended) The [[A]] method according to ~~Claim~~ claim 12 including making a hard determination of a received symbol based upon a soft output from calculating the

possible conditional probabilities ~~the decoding operation~~.

21. (Currently Amended) A method of reducing a ~~the~~ computational load of a signal processor in a multiple input multiple output (MIMO) architecture including a plurality of transmission elements and a plurality of receiving elements, wherein the method comprises ~~MIMO architectures comprising the steps of~~:

~~i)~~ receiving composite ~~input~~ signals having spatial diversity from each of the plurality of receiving elements ~~a set of n receiver elements~~;

~~ii)~~ constructing an n by m channel matrix from values indicative of channel gains between each ~~transmit and receive element~~ of the plurality of transmission elements and each of the plurality of receiving elements, wherein n denotes a number of the receiving elements, and wherein m denotes a number of the transmission elements;

~~ii)~~ executing a QR decomposition upon the channel matrix to form an upper triangular R matrix and a unitary Q matrix;

~~iii)~~ enumerating to determine probabilities of a given symbol being transmitted from a given transmission element of the plurality of transmission elements ~~transmitter~~ using a constrained data sub-set of the triangular R matrix; and

~~iv)~~ making a hard decision about which ~~possible symbol~~ is the most probable symbol to have been transmitted from the given transmission element so as to reduce a ~~the~~ number of enumerations required to carry out a further probability calculation.

22. (Currently Amended) The method of ~~Claim~~ claim 21 including using sub-optimally determined symbol values to generate final definite symbol values.

23. (Currently Amended) A computer readable medium having stored therein computer executable instructions, ~~for causing a~~ wherein the instructions are executable by a processing unit that cause the processing unit to ~~execute the method of Claim 12~~ perform operations comprising:

receiving a composite signal indicative of a plurality of symbols;

performing a QR decomposition upon a channel gain matrix for the composite signal, wherein the QR decomposition comprises an upper triangular R matrix and an orthogonal Q matrix;

defining an enumeration constraint of the R matrix, wherein the enumeration constraint comprises a number of entries in the R matrix over which the plurality of symbols are enumerated;

calculating possible conditional probabilities for one of the plurality of symbols contained within the composite signal, using the enumeration constraint; and

iterating said calculating incorporating a most probable symbol for the one symbol determined in a previous iteration of the conditional probability calculation.

24. (Cancel)

25. (New) The computer readable medium of claim 23, wherein the plurality of symbols are transmitted by four or more transmitting elements, wherein the composite signal is received by four or more receiving elements, and wherein the operations further comprise:

calculating a conditional symbol probability for a fourth receiving element based on channel information received for a third receiving element and the fourth receiving element to determine a fixed value for a symbol with a highest conditional probability for the fourth receiving element; and

calculating a conditional symbol probability for the third receiving element based on channel information received for a second receiving element and the third receiving element and based on the fixed value, wherein the conditional symbol probability for the third receiving element cancels out interference from a fourth transmitting element.

26. (New) An apparatus comprising:

means for receiving composite input signals having spatial diversity from each of a set of n receiver elements;

means for constructing an n by m channel matrix from values indicative of channel gains between each transmit and receive element, wherein m denotes a number of transmission elements;

means for executing a QR decomposition upon the channel matrix to form an upper triangular R matrix and a unitary Q matrix; and

means for enumerating to determine probabilities of a given symbol being transmitted from a given transmission element using a constrained data sub-set of the triangular R matrix.

27. (New) The apparatus of claim 26, wherein the enumeration constraint comprises a number of entries in the triangular R matrix over which the given symbol is enumerated.

28. (New) The method of claim 14, wherein the R matrix comprises an upper triangular structure of non-zero elements and a lower triangular structure of zero elements.